DOCUMENT RESUME

ED 226 586 FL 013 482

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TITLE A Comparison of Nineteenth- and Twentieth-Century Models of Reading in a Second Language.
PUB DATE Aug 82
NOTE 20p.; Paper presented at the International Symposium on Language for Special Purposes (Eindhoven, The Netherlands, August 2-4, 1982).
PUB TYPE Speeches/Conference Papers (150) -- Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Auditory Perception; Comparative Analysis; Literacy; *Models; *Reading Comprehension; Reading Processes; *Second Language Learning; Visual Perception

ABSTRACT

Nineteenth- and twentieth-century models of first and second language reading are examined and compared. Figures are provided of six models that propose relationships among visual input and processes, auditory input, phonological processes, and comprehension. These models illustrate the processes that may be operating in persons who achieve their initial literacy in a second language and in those who learn to read in a second language after becoming literate in their native language. There is controversy regarding whether comprehension is dependent on phonological processes or can occur directly from visual input in fluent readers. Six possible single routes and numerous multiple routes for comprehension of second language texts are identified. The nineteenth-century models are equally complex, providing for recoding of auditory input into visual form as well as for reading aloud without comprehension. In conclusion, there is a need for models that summarize existing data, and for more complex models that generate hypotheses. (RW)

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ED226586

A comparison of nineteenth- and twentieth-century models of reading in a second language

Paper presented at the LSP International Symposium on Reading for Professional Purposes in Native and Foreign Languages, Eindhoven University of Technology, Netherlands, 2-4 August 1982.

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Although models of reading in the mother tongue are numerous and have developed considerably in recent years, models of reading in a second language are still in their earliest infancy. One of the few models of L2-reading is that proposed by Ulijn (1980). One reason for the scarcity of such models is clearly that the business of model-making is dominated by native speakers, and readers, of English who in general have less need to learn to read another language. In Britain, this tendency has gone so far that the title of a recent book described learning to read a foreign language as 'the forgotten third skill' (Kellermann, 1980). This concentration on the reading of the mother tongue neglects those large sections of the world's population who must achieve even initial literacy, if they achieve it at all, in a second language, or whose work requires them to be literate in at least one other language besides their first.

With the former group this book is not directly concerned, but it is worth noting Gorman's (1977 p.275) opinion that 'with regard to reading, there would... be general agreement that learners should not be asked to read material that they would not readily understand if spoken'. This seems to imply the entirely reasonable theory that, just as learning to read one's native language must lag behind, and be dependent on, learning to understand and speak it, so achieving initial literacy in a second language is dependent at least on being able to understand that language when spoken. But then a controversy about the psycholinguistic processes underlying L1-reading becomes relevant also to L2-reading. The controversy about L1-reading is whether in fluent readers comprehension is still dependent on phonological processes or can occur directly from the visual input. No final answer to this question is yet available, but the basic set of choices is illustrated (heavily simplified) in Figure 1.

FIGURE 1

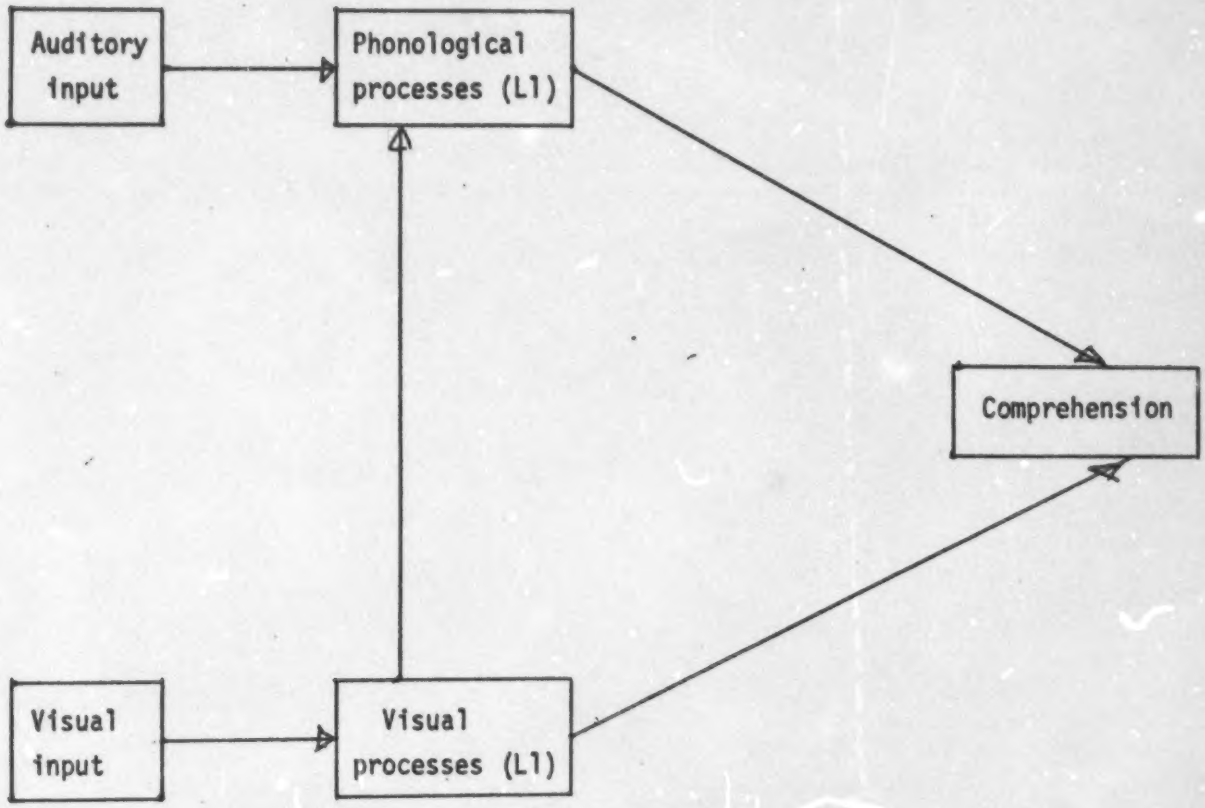


Figure 1: General model of speech comprehension and reading in a first language.

Here speech as well as reading input is shown, for reasons which will become clearer, and the term 'phonological' is to be understood in the widest possible sense, that is it may cover either auditory or articulatory processes or both. Also, it need not imply that at any stage between input and comprehension the signal is in phonemic form, that is it consists of a string of segments of phoneme size. All that 'phonological' implies here is 'based on sound' (cf. McCusker, Hillinger and Bias, 1981, p.218).

Figure 1 offers two routes for the passage of signals from input to comprehension, one purely visual, the other phonologically mediated. Many models of L1-reading fall into two classes corresponding to these two routes, and could be collectively called single-route theories since they assume that only one of the two routes exist. But logically there is a third possibility, namely that both routes exist and are active, either at different levels of fluency of the reader, or at different levels of difficulty of the text, or at different stages between first learning to read and becoming fluent. Theories which assume the existence of both routes can be called 'parallel' models, and these are the first examples of the class of 'multi-route' theories, of which several more will be illustrated shortly.

Figure 1 classifies only certain possibilities in the reading of a first language. A diagram relevant to those who first learn to read not in their mother tongue but in an L2 is shown in Figure 2.

FIGURE 2

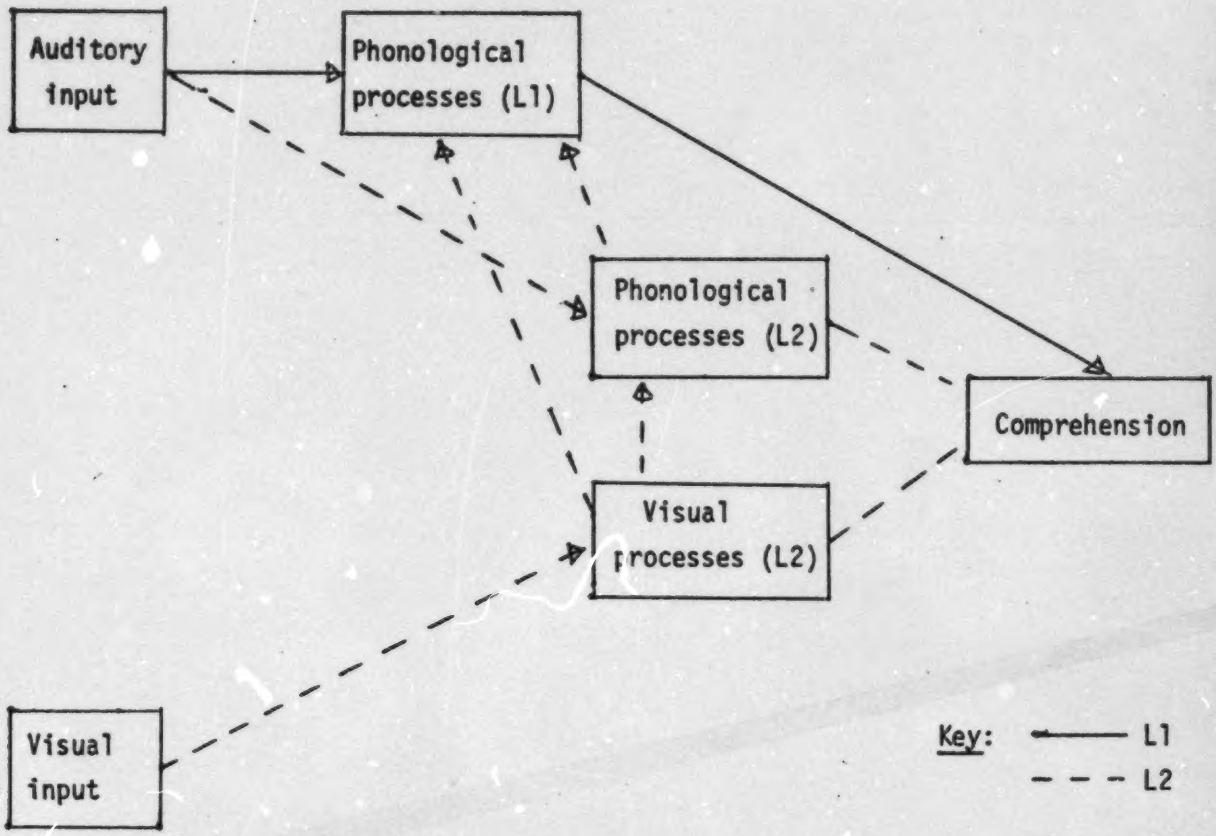


Figure 2: General model of initial literacy in a second language.

Here L1 routes are shown by solid lines, L2 routes by broken lines. Auditory comprehension of the L2 is now in the position occupied in Figure 1 by L1 - reading: that is, the theoretical possibilities are that the spoken L2 can be understood either direct, or via the phonological processes serving auditory comprehension of the L1, or both. If L1 phonological processes are involved, then this would correspond to the experience, especially common in the early stages of learning a

second language, of having to translate the spoken words internally into the mother tongue before they can be understood.

The complication of Figure 2, however, arises mainly in connection with L2-reading. Here the possibilities are that it proceeds by the direct visual route, or by phonological mediation within the L2, or by phonological translation into the L1, or by both forms of recoding. If this last possibility seems remote, consider the situation of people who can read a foreign language only hesitantly. They may subvocalise or even mumble the words in order to provide an 'auditory image' to 'listen in to', so that they can translate into their L1 and then understand. Such situations do seem to occur, but they would still technically be only a 'single-route' process. Within Figure 2, several 'multi-route' or parallel processes are possible, involving two or three or even all four of the single routes.

So much for those who do <u>not</u> first learn to read in their mother tongue: what of those who do, and later learn to read another language? In the opinion of one linguist, they have no problem: 'there is empirical evidence enough to suggest that once literacy is obtained in one language, there is rarely trouble in obtaining it in another language with a similar type of writing system' (Berry, 1975). This seems an extraordinary view for a distinguished Maker of Alphabets (Berry, 1958) to hold. If taken seriously, it would mean that the conference on which this book is based would never have been held. It is safe to assume that very few of the participants at that conference would agree with Berry's view: even if it were true, the problem of understanding the processes involved in reading both first and second languages would retain its fascination for many researchers.

Figure 3 is therefore offered as a basic representation of some of the processes that may be operating in persons who, being already literate in their mother tongue, read a second language. This Figure consists deliberately of Figure 1

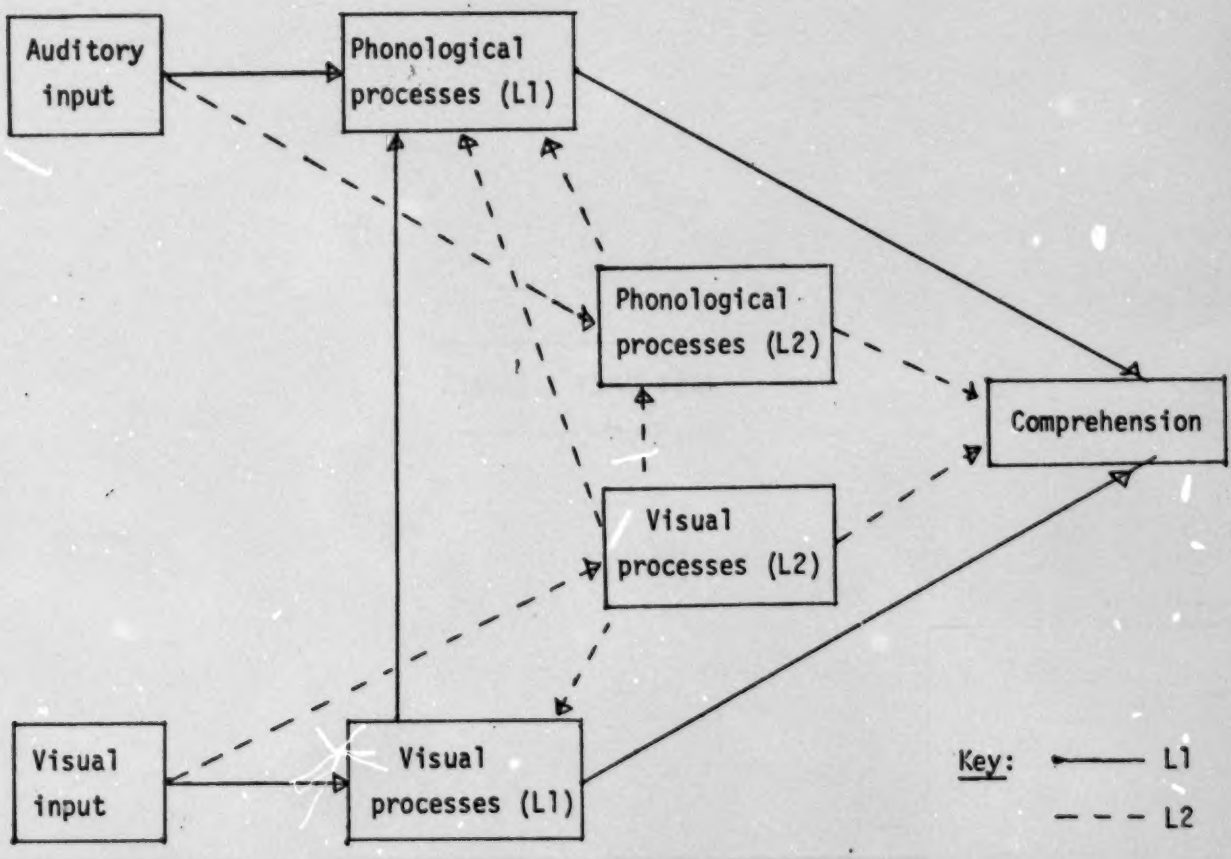


Figure 3: General model of speech comprehension and reading in a first and in a second language.

as its main framework, and Figure 2 partly superimposed on and partly nested within it. There is also one extra line present in neither of the previous figures, namely that connecting Visual processes (L2) to Visual processes (L1): this is to cover the theoretical, if remote, possibility

that text in a second language might be translated into a visual image in the first language before being understood. If this unlikely route is included, then this model permits six possible single routes for the comprehension of L2-text, and an extraordinary number of possible multi-route theories combining any two, three, four or five or all six of the single routes.

At this point, doubts should certainly be arising over the sanity of this exercise. What is the point of developing a model of such Byzantine complexity when we know so little about the psychological processes involved in L2-reading? Isn't a model like this a totally unfalsifiable abstraction with no practical application? Wouldn't it be better to develop simpler models to account for the facts that are known, and then test those and draw out their implications for teaching? These are undeniably strong objections, but against them it can be said:

1. there is no good reason to expect the structure of human cognition to be simple, and every reason to expect it to be complex;

2. since it is true that we know very little about L2-reading, there would be little point in proposing only simple models which seem to rule out possibilities that need to be tested;

3. it will shortly be shown that the situation may in fact be even more complicated than is envisaged in Figure 3.

For instance, one of the assumptions embodied in Figure 3 is that because reading is learnt after speech, visual input may be recoded into phonological form, but auditory input is never recoded into visual form. That this last idea may be wrong, at least where a second language

has been learnt mainly or wholly in its written form, is suggested by the two following quotations, which report essentially identical experiences, and are all the more striking for being widely separated in time:

> There are surely many people who have only read English and never spoken it, and so proceed as I do. That is, when they hear English spoken, they quickly visualise what they hear as though it were written and then understand it, i.e. perceive the thought. This arises from the difference between spelling and pronunciation, and from being in the habit of always having the spelling in mind. I think this proves that if someone speaks English to us, we think not in English sounds but in English script. (Steinthal,1855, p.158).

> I have the impression that . . . transformation of phonemic representations to graphemic representations as an aid to comprehension . . . might be found if one looked for them. The basis for this conjecture is the recollection of the experience of being for the first time in a French-speaking country, after having taken high-school French courses in which I learned to read the language passably well but acquired essentially no skill in speaking it or understanding it in the spoken form. What I found myself doing in a frantic effort to understand what was being said to me was to ask people to speak slowly so that I could visualize the words. (Nickerson, 1981, p. 285n).

If this experience, for which the name 'Steinthal phenomenon' may be appropriate, is at all common, then it would provide introspective evidence that auditory input can be recoded into visual form in certain circumstances. This would mean both that Figure 3 is still not complicated enough - it needs a line from Phonological processes (L2) to Visual processes (L2) - and that the possibility of auditory-to-visual recoding deserves experimental investigation. How this could be done is, however, not yet clear.

A second line of evidence which tends to show that the true position in L2-reading may be more complicated than Figure 3 is pathological, i.e. cases of language loss in previously literature adults. Of

particular interest in the present context are cases of educated people, able to read more than one language, who as a result of stroke or brain injury lose the ability to read. In rare cases, one of the patient's languages may be more affected, or may recover more quickly, than another. The earliest such case known seems to be that reported by Gesner (1770 - for summaries see Benton and Joynt, 1960, pp.213-215 and Benton, 1964, pp.319-320) of a German abbot who as the result of a very slight stroke was unable to speak for three days and unable to read for rather longer. Eventually he partially regained the ability to read, but the degree of recovery was greater for Latin than for German. Since German must have been his L1, the greater recovery of ability to read Latin would seem to show both that he had, before the stroke, had massive practice in reading Latin (which seems likely), and that his ability to read Latin was independent of the visual processes by which he read German.

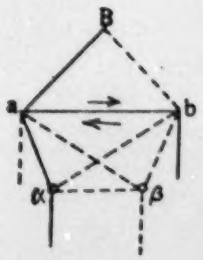
A somewhat similar experience befell a French professor called Lordat in the early 1840s and he reported his self-observations in a book published in 1843. A stroke left him unable to read anything except single letters: 'l'alphabet seul m'était resté', as he later put it. He was unable even to combine the individually recognised letters into words, until one day he was delighted when his eye fell upon the spine of one of his books and he found himself able to read the words 'Hippocratis opera'. It may have been fortuitous that the first words he recovered the ability to read were Latin rather than French, but again this may show that Lordat's reading of Latin was independent of at least the visual processes by which he read his mother tongue.

A third respect in which Figure 3 is incomplete is that it provides no mechanism for reading aloud. One way to do so would be to add two boxes to the right of Comprehension labelled Articulatory Processes and

Speech and connect them up with arrows. This would still be insufficient, because it is obvious that oral reading can occur without any comprehension, and in a foreign language this separation may be total. The English poet Milton, for example, became blind towards the end of his life, but did not wish to be cut off from the classics. So he taught his second wife to read aloud to him in Latin and in Classical Greek, of which she understood not a word. A similar but much more mundane example can be given from the present writer's own experience. He earlier lived and worked for several years in Kenya, and on a few occasions read aloud to an illiterate Kikuyu letters written in Kikuyu. The man's secrets were completely safe, since this writer did not understand any of that language.

Nineteenth-century theorists of reading were well aware of the need to provide mechanisms for reading aloud within their models, and a brief examination of just three such models will illustrate both how this mechanism was provided and a range of complexity in the models at least as great as that in Figures 1 - 3. First, then, is the diagram of Wernicke (1885-6) shown in Figure 4.

FIGURE 4



Key:
- α centre for visual memories
- a centre for auditory memories
- B concept centre
- b speech-motor centre
- β centre for writing

Figure 4: Diagram of Wernicke (1885-6, part 3, p.471), illustrating reading aloud with understanding

Here the solid lines represent routes Wernicke considered were active in reading, broken lines routes which served other linguistic processes. The single route α-a-B served silent reading with comprehension; the route α-a-b oral reading without comprehension, which Wernicke explicitly likened to reading an unknown language; and oral reading with comprehension used both routes at once. Within the terms defined earlier, Wernicke was definitely a 'single-route' theorist of reading, because he believed that all reading, even in the most fluent adult, was mediated by the auditory processes represented in his diagram by the point a.

FIGURE 5

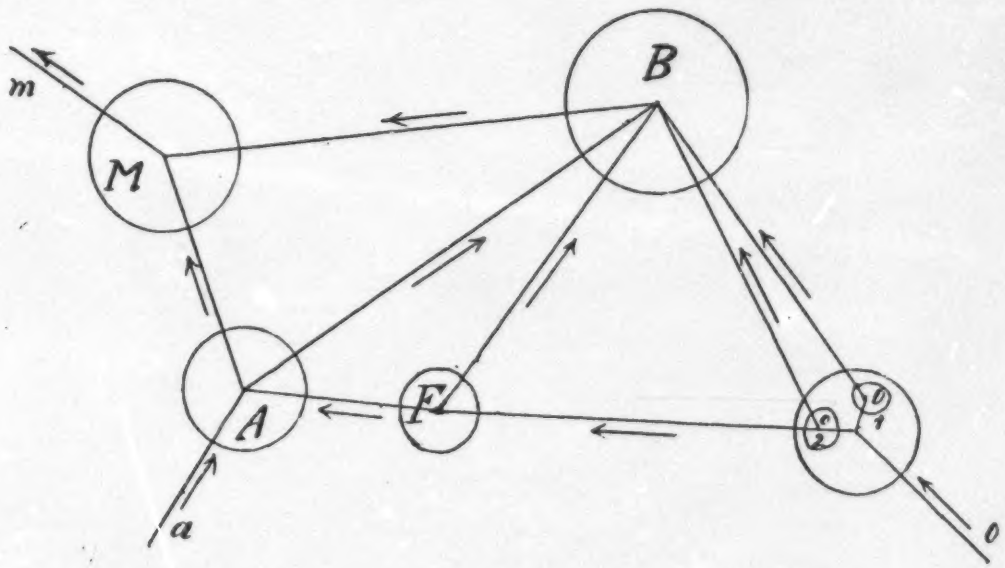


Figure 5: Diagram of Weissenberg (1891, p.423)

Key:	a	acoustic nerve		M	motor centre
	A	auditory centre		m	motor paths
	B	concept centre		o	optic nerve
	F	letter-association centre		o_1	visual word centre
				o_2	letter centre

'Many paths which have nothing to do with reading have been omitted for the sake of clarity.'

Rather more complex was the diagram of Weissenberg (1891) shown in Figure 5, which provided five different routes for reading of different kinds. First, the route o_2FAMm, connecting the visual centre O, the 'letter-association centre' F, the auditory centre A and the speech centre M served reading aloud without comprehension, which Weissenberg also compared to reading an unknown language. Children and less fluent adults reading their mother tongue aloud in order to comprehend used the route o_2FAMm + aAB, where the visual input is converted to speech before being understood through the ear. The recognition of single letters had its own route, o_2B; and finally silent reading with comprehension had two routes, o_2FB in which the separate letters were recognised and then combined in F to produce recognition of words, and o_1B which served the instantaneous recognition of a strictly limited number of words as wholes. Weissenberg's model contained definite errors (e.g. he did not even consider the possibility that route o_2FAB, corresponding to Wernicke's theory, might exist), but at least it avoided the over-simplication of Wernicke's.

At the opposite extreme entirely was the theory of Charcot (1884), whose diagram is reproduced as Figure 6.

FIGURE 6

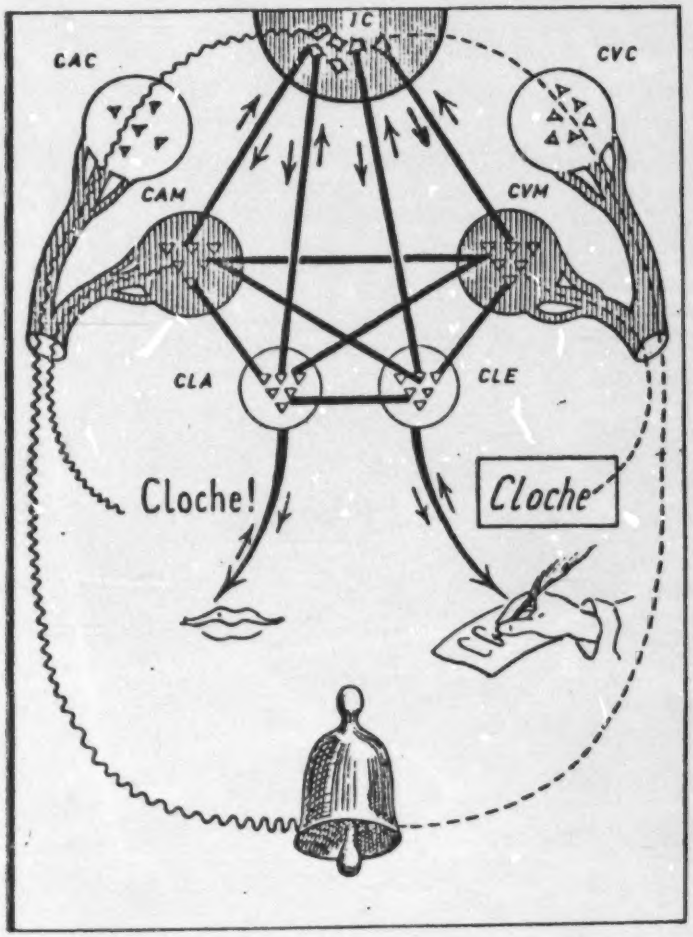


Figure 6: Diagram of Charcot (1884), reproduced from Ballet (1886, p.7)

Key:

IC	ideational centre
CAC	common auditory centre
CAM	auditory centre for words
CLA	centre of articulate language
CVC	common visual centre
CVM	visual centre for words
CLE	centre of written language

Charcot believed that human personality types varied widely, and his model therefore allowed every possible mechanism for reading. 'Visual' types would read by the direct route CVM-IC; 'auditory' types by the route CVM - CAM - IC; and 'motor' types by the route CVM - CLA - IC. Pure types, however, were rare: most people would be 'indifferent' or 'mixed' types who would read by a mixture of methods. Charcot's model is therefore very complex, but precisely because it allows for every possibility, it may be impossible to disprove, since nothing could count as evidence against it. However, it should be noted that within the model, reading aloud without comprehension would use the route CVM - CLA, whether in L1 or an L2.

This prediction from Charcot's model shows that for him the dissociation of oral reading from comprehension was not confined to foreign languages. It is clear subjectively that the effort of reading the L1 aloud with expression may reduce or abolish understanding. This state may be reproduced by certain pathological conditions. Thus there have been occasional reports of people who retain the ability to read aloud fluently but lose all understanding of what they read (e.g. Dejerine, 1880; Schwartz, Saffran and Marin, 1980). This condition is normally accompanied by loss of the ability to comprehend speech: if it were not,

it would be expected that the reader's own voice would lead to comprehension, even if the direct route to meaning had been lost. Yet even here the complexities multiply: Goix (1893, cited in Ferrand, 1894, pp.143-148) reported the case of a French girl aged 24 who had irregular attacks during which she was completely unable to understand what she read, either silently or aloud, despite being able to read aloud fluently and expressively and to understand when spoken to. The explanation here may have been emotional - Goix labelled her as an hysteric and said she regularly read aloud to an old man - but the case again points to dimensions of reading not accounted for in many models of L1-reading, let alone L2-reading.

What conclusions are to be drawn from all this? There is clearly a need for models of L2-reading, and these should be of two types. First, models are needed which sum up existing data. Since existing data are relatively limited, models of this type will be soundly-based and simple. Yet simple models have a tendency to be interpreted restrictively, that is as if reality were limited to those aspects which can be accommodated within the model. This in turn tends to give rise only to investigations which confirm the model, not to those which might extend or disprove it.

Models of a second type are therefore also needed. These will be much more complex and speculative and will go well beyond existing data. They will be intended to show, not what <u>is</u> the case, but what <u>might</u> be. They will serve as tools of the imagination, generating hypotheses to be explored. The Figures in this paper, both nineteenth- and twentieth-century, are offered as examples of this category.

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Acknowledgements

Much of the research on which this paper is based was done while the author was in receipt of Social Science Research Council of England and Wales grant no. S77/20355/ERB. The author's attendance at the conference was supported by a grant from the National Foundation for Educational Research in England and Wales.